OBSERVATION OF DIPOLE-BOUND STATE AND HIGH-RESOLUTION PHOTOELECTRON IMAGING OF COLD ACETATE ANIONS

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We report the observation of a dipole-bound state and a high-resolution photoelectron imaging study of cryogenically cooled acetate anions (CH_3COO^-). Both high-resolution non-resonant and resonant photoelectron spectra via the dipole-bound state of CH_3COO^- are obtained. The binding energy of the dipole-bound state relative to the detachment threshold is determined to be 53 $\pm 8\ \mathrm{cm}^{-1}$. The electron affinity of the $\mathrm{CH_3COO}\bullet$ neutral radical is measured accurately as 26 236 $\pm 8\ \mathrm{cm}^{-1}$(3.2528 ± 0.0010 eV) using high-resolution photoelectron imaging. This accurate electron affinity is validated by observation of autodetachment from two vibrational levels of the dipole-bound state of CH_3COO^-. Excitation spectra to the dipole-bound states yield rotational profiles, allowing the rotational temperature of the trapped CH_3COO^- anions to be evaluated [1].

[1] D. L. Huang, G. Z. Zhu and L. S. Wang, $J.Chem.Phys.$, 2015, **142**, 091103